

**Embargoed until Wednesday, April 26th at 8:55am ET**

**Date: Wednesday, April 26, 2017**

**Time: 8:55 – 9:15 AM**

**Concurrent Session J1: Emerging Infections**

**Room: Frieden Plenary**

**Moderators: Christopher Braden and Mike Gronostaj**

**Title:** Prediction of the Zika Virus Infection Burden in Puerto Rico using Bayesian Methods, November 2015–October 2016

**Authors:** Jessica Healy, Dania M. Rodriguez Vargas, Emilio Dirlikov, Brenda Rivera, Bradford Greening, Jr., Steve Waterman, Michael A. Johansson

**Background:** Bayesian methods offer rapid, cost-effective ways to estimate infection burden during an outbreak when a population-level serosurvey may be infeasible. During November 2015–October 2016, the Puerto Rico Department of Health (PRDH) reported 31,464 confirmed Zika virus (ZIKV) infections. Since ~80% of ZIKV infections are asymptomatic and mildly symptomatic individuals might not seek care, the infection burden is unknown. We used Bayesian methods to estimate the infection burden in the general and pregnant populations, and the rate of microcephalic births expected during the outbreak in Puerto Rico.

**Methods:** Weekly ZIKV surveillance data for arboviral diseases, Guillain-Barré syndrome (GBS), and blood donations were sourced from PRDH. These data and published rates of ZIKV infections per clinical or GBS case informed weekly distributions of ZIKV infection probability during November 2015–October 2016. To estimate infections during pregnancy over time, weekly infection probability was applied to simulated pregnancy cohorts based on the 2015 birth rate in Puerto Rico. Published trimester-specific microcephaly risk estimates were applied to the simulated infected pregnancies to temporally predict microcephalic live-births.

**Results:** During November 2015–October 2016, we estimated 440,000–1,100,000 (interquartile range [IQR]) ZIKV infections to have occurred and 2,900–4,100 (IQR) pregnant women were presumed to be infected. We predicted one microcephalic live-birth would occur per week starting in late August 2016.

**Conclusions:** Using Bayesian statistical methods which incorporate uncertainty and variability in the data to reduce bias, we estimated the infection burden during the ZIKV outbreak in Puerto Rico to be 15–37 times the number of reported infections, thus providing more realistic estimates to inform the public health response, including the planning for ZIKV-associated birth defects.